Remarks

This paper represents Applicants' first opportunity to comment on the new rejection to the pending claims set forth in the final Office Action. For the reasons stated herein, Applicant requests that the Examiner reconsider and withdraw the rejection set forth in the final Office Action. Further, Applicant respectfully submits that all claims are in condition for allowance. Claims 1-11 remain pending.

In the final Office Action, claims 1-11 were rejected under 35 U.S.C. §103(a) as being obvious over Latif et al. (U.S. Patent No. 6,393,483 B1; hereinafter Latif) in view of Chen et al. (U.S. Patent No. 5,831,975; hereinafter Chen). This rejection is respectfully, but most strenuously, traversed and reconsideration and withdrawal thereof are requested.

Applicant requests reconsideration and withdrawal of the obviousness rejection on at least the following grounds:

(1) The final Office Action fails to state a *prima facie* case of obviousness against Applicant's claimed invention;

(2) The final Office Action has misinterpreted the teachings of Latif and Chen, thus voiding the basis for the rejection; and

(3) The applied art would not be combined as proposed, and lacks any teaching, suggestion or incentive for its further modification as necessary to achieve Applicant's recited invention.

Failure to State a Prima Facie Case of Obviousness:

The rejection set forth is believed clearly deficient in stating a *prima facie* case of obviousness. To support a conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. MPEP §706.02(j).

In this case, the final Office Action presents little reasoning regarding the relevancy of the concepts of Latif to Applicant's claimed invention. Thus, Applicants understand that the final Office Action is asserting that the Latif patent itself teaches those aspects of Applicant's recited invention as set forth at page 3, line 15 – page 4, line 4 of the final Office Action. Such a conclusion is believed clearly *not* supported by the teachings of Latif cited in the final Office Action (i.e., FIG. 2; column 5, lines 10-67; column 7, lines 1-55 & column 11, lines 21-45).

More particularly, the final Office Action repeats the language of Applicant's claims, and then asserts in parentheses particular teachings of Latif which supposedly teach or suggest the recited invention. However, Applicant respectfully submits that the differences between the environment and the functionality of his claimed invention in comparison with Latif are so numerous as to render any parenthetical comparison to specific teachings of Latif deficient. For example, Applicant recites in claim 1:

> A processing method for a distributed computing environment having multiple networks of computing *nodes employing multicast messaging*, each network having at least one computing node, at least one computing node of said multiple networks of computing nodes *functioning as a multicast routing node*

In stating the rejection, the final Office Action repeats the language of Applicant's claim 1 and then cites FIG. 2, as well as column 5, lines 29-67 of Latif. However, the citation is clearly deficient since a careful reading of Latif fails to uncover any discussion of:

(1) Networks of computing *nodes employing multicast messaging*; and

(2) At least one computing node of the multiple networks of computing nodes *functioning as a multicast routing node.*

The term "multicast messaging" refers to a specific messaging protocol which is distinct from standard internet protocol routing. A "multicast routing node" refers to a particular type of node performing particular functions associated with multicast messaging. As known in the art, multicast messaging is a particular communications protocol wherein one sender sends a single message to many receivers. Thus, to the extent that the final Office Action at page 3 asserts that Latif describes the environment set forth in claim 1, Applicant respectfully submits that the rejection is deficient.

This is expressly recognized in the final Office Action at page 4 where it is stated that "Latif does not teach a multicast routing functionality with multicast routing nodes in a distributed environment to maintain multicast message reachability."

In view of this inconsistency of the final Office Action, Applicant is unable to address any alleged relevancy of Latif, and therefore respectfully submits that a *prima facie* case of obviousness is not stated in the rejection set forth. Reconsideration and withdrawal of the rejection is therefore requested.

Still further, Applicant recites processing which includes:

- *Automatically responding to failure of a computing node functioning as multicast routing node of the at least one computing node functioning as the multicast routing node to reassign the multicast routing function.*

Again, the final Office Action merely cites column 5, lines 10-28 of Latif for allegedly teaching this aspect of his recited invention. However, the citation is believed deficient. A careful reading of Latif, column 5, lines 10-28 fails to uncover any teaching of:

(1) Automatically responding to a *failure of a computing node*;

(2) Automatically responding to a failure of a computing node *functioning as multicast routing note*; or

(3) Automatically responding to a failure of a computing node functioning as multicast routing node *to reassign the multicast routing function.*

A careful reading of Latif, column 5, lines 10-28, fails to uncover any discussion of an automatic response to failure of a computing node functioning as multicast routing node. In addition, there is no failure of a computing node *per se* described in Latif. Rather, Latif describes failure of a network interface card (NIC) within a host or server. The host/server equates to a node in one of the networks. Since the server itself does not fail, but rather only a component of the server fails, i.e., the internet NIC card, the teachings of Latif do not equate to Applicant's recited process (wherein there is a failure of the computing node itself). As such, there can be no *automatically responding to failure* of a computing node *per se*, let alone automatically responding to the failure of a computing node *that functions as a multicast routing node*.

Further, Applicant is unable to understand the rejection set forth in the final Office Action in this regard. It appears at page 4, lines 5-6 that the Examiner recognizes that Latif only describes failing ports, instead of failing nodes, notwithstanding the citation at page 3 of column 5, lines 10-28 of Latif. Based on this express inconsistency, Applicant respectfully submits that a *prima facie* case of obviousness is not set forth in the final Office Action. Applicant is unable to ascertain the alleged relevancy of column 5, lines 10-28 to the particular functionality recited in the independent claims presented.

Still further, Applicant recites:

- *wherein the automatically responding includes dynamically reconfiguring the distributed computing environment to replace each failed multicast routing node of the at least one multicast routing node with another computing node of the multiple networks of computing nodes to maintain multicast message reachability to all functional computing nodes of the distributed computing environment.*

With respect to this functionality, the final Office Action again repeats the language at issue and cites column 5, lines 10-67, column 7, lines 1-55, & column 11, lines 21-45 of Latif. However, the final Office Action then recognizes that Latif does not describe the existence of a failing node, let alone the existence of a multicast routing node which fails.

For similar reasons for those stated above, Applicant is unable to understand the relevancy of the cited lines of Latif to the repeated functionality of Applicant's recited invention at issue. There is no dynamic reconfiguring of a distributed computing environment to replace a failed multicast routing node in Latif. Further, there is no dynamic reconfiguring of the distributed computing environment in a manner which allows for maintenance of multicast message reachability to all functional computing nodes of the distributed computing environment in Latif. Thus, Applicant respectfully submits that columns 5, 7 & 11 of Latif are not relevant to the language at issue. As such, Applicant respectfully submits that the final Office Action fails to state a *prima facie* case of obviousness against the independent claims presented.

Yet further, the final Office Action combines the teachings of Chen with those of Latif, and alleges that Chen teaches that a failing port could comprise a failing node, and that the Latif concepts could be employed in a multicast routing functionality with multicast routing nodes in a distributed environment to maintain multicast message reachability. Applicant respectfully, but most strenuously, traverses these characterizations of the teachings of Chen.

Chen describes extending the PNNI protocols to support hierarchical multicast routing and signaling for ATM networks. Chen utilizes an extension of a core-based tree algorithm wherein core nodes are maintained in each peer group and at each level of the hierarchy. The advantage of the Chen approach is that a single core node is not overloaded. Additionally, this creates fault-tolerance because there is no single point of failure.

Applicant respectfully submits that a careful reading of Chen, as well as the final Office Action, fails to uncover any discussion of *failure of a computing node* presented in Chen, let alone failure of a computing node functioning as multicast routing node. Still further, a careful reading of Chen and the final Office Action fails to uncover any discussion of automatically responding to the failure by dynamically reconfiguring the distributed computing environment to replace each failed multicast routing node to maintain multicast message reachability to all functional computing nodes. Since, as noted above, these aspects of the invention are not described by Latif, as expressly recognized at page 4 of the final Office Action, and since the aspects are not described by Chen, nor asserted in the final Office Action to be described by Chen, it is respectfully submitted that the final Office Action fails to state a *prima facie* case of obviousness against the claims presented.

The Final Office Action Mischaracterizes the Teachings of Latif and Chen:

Latif discloses a process for driving a network interface card. The process includes: monitoring the status of a plurality of ports connected between a computer and a network; detecting a failure in one of the plurality of ports connected to the network; and reassigning data transmitted over the failed port to an active port of the plurality of ports selected in a round-robin technique. The process further includes receiving data over one of the ports designated as a primary receiving port. When the failed one of the plurality of ports is the primary receiving port, the receiving tasks are assigned to a next active port selected in a round-robin technique. (See Abstract of Latif.)

In addition to failing to state a *prima facie* case of obviousness against the independent claims at issue, Applicant respectfully submits that the final Office Action mischaracterizes the teachings of Latif by repeating the language of Applicant's recited invention and then simply citing various columns and figures from Latif. As noted in detail above, the environment and process recited by Latif are simply not relevant to Applicant's recited invention and process.

A careful reading of Latif, in particular, FIG. 2 & column 5, lines 10-67, column 7, lines 1-55 & column 11, lines 21-45, fails to uncover any discussion of the environment recited by Applicant in the claims at issue.

Specifically, Applicant recites a distributed computing environment wherein there are multiple networks of computing nodes which employ multicast messaging. There is no discussion in Latif of multicast messaging *per se*, which as noted above, is a particular type of messaging protocol distinct from standard internet protocol. Further, Applicant's claims recite that one of the nodes in at least one of the networks functions as a *multicast* routing node. A multicast routing node is a particular node having multicast routing functionality, as recited in the claims. No multicast routing functionality is described in Latif, nor in the parenthetical citations of the final Office Action citing various columns and figures of Latif. As such, Applicant respectfully submits that the final Office Action mischaracterizes the teachings of Latif when simply restating the language of claim 1 of the present invention and then alleging certain relevancy to various columns and figures in Latif. This mischaracterization appears to be recognized in the final Office Action at page 4, where it is noted that Latif discloses failing ports, but not failing nodes; and that Latif does not teach a multicast routing functionality with multicast routing nodes in a distributed computing environment to maintain multicast message reachability. Based on this inconsistency, Applicant is unable to ascertain the alleged relevancy of Latif to his recited invention.

Additionally, Applicant respectfully submits that the final Office Action mischaracterizes the teachings of Chen to the extent that the final Office Action alleges that Chen teaches the deficiencies of Latif when applied against the claims at issue. At page 4 of the final Office Action, with respect to Chen, it is stated:

> ... the scheme is highly scalable to large networks because routers have to maintain only one tree per multicast group. The method supports dynamic membership to a multicast group, in that, nodes can join or leave the multicast group during the course of the multicast. Multiple senders to the multicast group are also supported, which enables realization of a true multipoint-to-multipoint connection. In addition, the multicast tree can be dynamically changed to reflect changes in the node and link states (see Chen, column 7, lines 53-63).

Initially, Applicant notes that the cited material from Chen does *not* describe detection or *responding to failure of a computing node functioning as a multicast routing node*, as specifically recited in the independent claims at issue.

Further, Applicant notes that the cited material from Chen does not teach or suggest that responsive to failure of a computing node functioning as multicast routing node, there is an automatic reassigning of the multicast routing function. Still further, Applicant respectfully submits that a careful reading of the cited material of Chen does not address that the automatic responding includes dynamically reconfiguring the environment to replace each *failed* multicast routing node to maintain multicast messaging reachability to all functional computing nodes. To the extent relevant, Chen simply describes a conventional multicast routing environment where nodes can join or leave a multicast group during the course of the multicast. There is simply no discussion in Chen of failure at a multicast routing node. In the language of Chen, the core node functions as the multicast routing node and Chen assumes that the core nodes will not change. (See column 8, lines 40-42 of Chen.)

To summarize, Latif does not describe failure of a node *per se* within a distributed computer environment, but rather failure of a port (NCI) card. As such, Latif cannot teach or suggest a process for automatically responding to failure of a node, let alone responding by the dynamic reconfiguration of the distributed computing environment to transfer multicast routing functionality as recited in Applicant's independent claims.

Further, there is no teaching of multicast messaging *per se*, let alone the provision of multicast routing functionality at a particular node, nor of a facility for automatically responding to failure of the node having the multicast routing functionality to automatically transfer that functionality to another node of the network of the distributed computing environment.

Multicast messaging and multicast routing functionality are known terms and refer to a particular type of messaging protocol. This messaging protocol is not taught by Latif.

Although Chen describes a multicast routing environment, a careful reading thereof fails to uncover any discussion of failure of a computing node thereof functioning as multicast routing node, or of automatically responding thereto by reassigning the multicast routing function. Still further, Applicant respectfully submits that a careful reading of Chen fails to uncover any teaching or suggestion that this automatically responding includes dynamically reconfiguring the distributed computing environment to replace each failed multicast routing node with another computing node of the multiple networks of computing nodes to maintain the multicast message reachability to all functional computing nodes.

For at least the above-noted reasons, Applicant respectfully submits that the independent claims patentably distinguish over the applied art. Reconsideration and withdrawal of the rejection to these claims is therefore requested.

The Applied Art Would Not be Combined as Proposed, and Lacks any Teaching, Suggestion or Incentive for its Further Modification as Necessary to Achieve Applicant's Recited Invention:

As noted, Latif discloses a process for driving a network interface card. The process includes monitoring the status of a plurality of ports connected between a computer and a network, detecting a failure in one of the plurality of ports connected to the network, and reassigning data transmitted over the failed port to an active port of the plurality of ports selected in a round-robin technique. At column 11, lines 8-20, Latif teaches:

> As will be described with reference to FIG. 9 below, a PRT timer route is controlled by the smart NIC driver 126 which scans all indicies of the PRT table and associated connected hosts to determine whether they are or are not actively transmitting data. In an initial scan, if the timer is currently set to "1," then the timer will be changed to "0" if the port is inactive. After a predetermined time-out, the smart NIC 126 will again scan all indices (i.e., from 0 to 225) of the PRT table and associated hosts, and again change all timers that are currently set to "1," to "0." However, if the timer is already set to "0," the smart NIC driver 126 will remove the connection to that remote host, and thereby make the port assigned to that host free.

Latif's process for monitoring for port failure relies upon a single smart NIC driver 126. This centralized failure detection and recovery approach would simply not be applicable to a distributed computing environment having multiple networks of computing nodes employing multicast messaging as recited in the independent claims presented. In Latif, the smart NIC driver scans the indices of a PRT table to determine if a particular port is transmitting data or not. In a distributed network such as recited in the claims presented, there is no single entity that has access to all the other nodes, and more particularly, to the multicast routing nodes. Thus, Latif's approach would simply not be applicable to an environment such as recited in the independent claims presented. In a multicast network environment, there is no one entity given access to all the other nodes. This is in part due to technology reasons, as well as scalability. Thus, Latif is describing a fundamentally different technology than could be applied in a distributed computing environment such as recited in the claims at issue. Since there is no central point which is in communication with each of the core nodes, it would not be possible to employ the centralized approach of Latif in the distributed environment of Chen.

Further, a careful reading of Chen fails to uncover any teaching or suggestion of a process for recovery should one of the core nodes fail.

For these additional reasons, Applicant respectfully requests reconsideration and withdrawal of the rejection stated in the final Office Action.

Conclusion:

Applicant respectfully submits that the pending independent claims patentably distinguish over the teachings and suggestions of Latif and Chen. The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

For example, with respect to claim 2, Applicant recites that *each group leader is coupled by a virtual interface to at least one other group leader of the computing nodes*. The term "virtual interface" is a term of art that is associated with protocol encapsulation. A careful reading of Chen fails to uncover any discussion of the creation or maintenance of a virtual interface.

Further, Applicant's claims 2 & 6 recite that the *failure occurs at a group leader node* and that there is automatic selection of a new group leader from functioning computing nodes of the respective group of group leaders having the group leader failure. No similar functionality is taught or suggested by Chen.

Still further, dependent claims 3 & 7 recite that the virtual interface is a multicast messaging tunnel between group leaders. A careful reading of Chen, and in particular, column 8, lines 16-57, fails to uncover any discussion relevant to this aspect of Applicant's invention. There is simply no discussion of a virtual interface comprising a multicast messaging tunnel between group leaders in Chen. Further, there is no discussion in Chen that the multicast messaging tunnel is established using a particular daemon, that is, an m-routed daemon.

For at least the above reasons, all claims are believed to be in condition for allowance and such action is respectfully requested.

If a telephone conference would be of assistance in advancing prosecution of the subject application, Applicant's undersigned attorney invites the Examiner to telephone him at the number provided.

Respectfully submitted,

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